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A proposed new genus of booted eagles (tribe Aquilini)

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Recent evidence from phylogenetic analysis that several long-accepted eagle genera are non-monophyletic, some of them paraphyletic, have realigned boundaries whilst also erecting groups that have yet to be accommodated in taxonomy. All of the above applies in *Aquila*. Sampling mitochondrial or both mitochondrial and nuclear DNA, four studies (Bunce *et al.* 2005, Helbig *et al.* 2005, Lerner & Mindell 2005, Haring *et al.* 2007) broke this traditional genus into well-defined clades the composition of which, within taxon sampling limits, is generally agreed. Up to three of these clades also absorb some or all of the content of other accepted genera.

We focus here on the spotted eagles: Greater Spotted Eagle *Aquila clanga*, Lesser Spotted Eagle *A. pomarina* and their sister taxon Indian Spotted Eagle *A. hastata* whose species rank has been proposed from morphological differences (Parry *et al.* 2002) and genetics (Väli 2006). Taken together, the above analyses identified these three taxa as a clade apart, by Helbig *et al.* (2005) as isolated from the rest by the common ancestor of other *Aquila* species and *Hieraaetus* (Booted Eagle *H. pennatus* and allies), a step also indicated by Haring *et al.* (2007) although not figured in other published trees.

Especially as the studies that sampled them (Helbig *et al.* 2005, Lerner & Mindell 2005, Haring *et al.* 2007) shifted one or other of the large-bodied *Hieraaetus*, Bonelli's Eagle *H. fasciatus* and African Hawk-Eagle *H. spilogaster*, and also Cassin's (Hawk-) Eagle *Spizaetus africanus*, into another of the *Aquila* clades, a broadening of *Aquila* to cover all of the species involved could have become the recognised arrangement. We believe this ceased to be acceptable with inclusion in the spotted eagle clade by Bunce *et al.* (2005) of monotypic (Indo-Malayan) Black Eagle *Ictinaetus malayensis*, by Helbig *et al.* (2005) of monotypic (Afrotropical) Long-crested Eagle *Lophaetus occipitalis*, and by Lerner & Mindell (2005) and Haring *et al.* (2007) in one or other of their published trees, of both: *Ictinaetus* shown by

Lerner & Mindell to be sister to the spotted eagles, and *Lophaetus* as sister to all of the rest of this clade. For technical reasons, Haring *et al.* (2007) put aside an alternative finding from their mtDNA control region, not corroborated by their cytochrome-*b* results, that rather than being a clade member Black Eagle might instead be linked to Asian *Nisaetus* hawk-eagles, but added that it would still 'be worthwhile to analyse this enigmatic species in more detail using all currently employed markers (nuclear and mitochondrial)'.

Ictinaetus Blyth, 1843, is the older of these two additional names and as a second nomenclatural option could theoretically have been extended to the entire clade (Haring *et al.*'s proposal that the name *Lophaetus* Kaup, 1847, could be so applied overlooked this priority). Black Eagle has a 'pot-hook' sky-dance display similar to that described for Greater Spotted and Lesser Spotted Eagles (Cramp & Simmons 1980, Wells 1999), and for Indian Spotted Eagle (Naoroji 2006), and looks superficially like a classic *Aquila*. However, its peculiar foot morphology plus proportionately long, square-tipped tail and low-loading wings, widest across the 'hand' and primary projection reaching to the tail-tip when folded, which permit this bird's long-sustained, low-speed glides over canopy surfaces in search of small mammals and other prey (including birds' nests, reportedly snatched whole) mark it out as a different kind of predator. Likewise, no one familiar with Long-crested Eagle in the field could easily agree that this black-and-white, buzzard-like bird with a tall, recurved crest, whinnying, kite-like vocalisations and still-hunting behaviour from a low perch (Ferguson-Lees & Christie 2001) is treatable as an *Aquila*, still less that it belongs in *Ictinaetus*; or, conversely (see Helbig *et al.* 2005), that the definition of *Lophaetus* itself be expanded to include spotted eagles.

Taxonomy and nomenclature

In our opinion, on present knowledge and in the absence of genetic distance 'rules' governing recognition of generic splits, parsimony is not served here by adopting compromise solutions. Either these birds are indeed all placed in *Aquila* or they are all different. To break this impasse and eliminate the paraphyly implied we choose to shrink rather than expand definitions, to retain *Ictinaetus* and *Lophaetus* as monotypic and to assign the three spotted eagles a unique genus of their own, in the apparent absence of anything available from synonymy (Sharpe 1874, Peters 1931), under a new name:

Aquiloides, gen. nov.

Type species.—*Aquila clanga* Pallas, 1811.

Diagnosis.—Medium-sized eagles (length 55–71 cm), with medium to notably broad, rounded wings and shortish, rounded tail. The adult head and body are typically uniform brown to blackish brown (except for the pale nape patch on *pomarina*), relieved only by pale-tipped uppertail-coverts, and immatures have buff-fringed breast feathers. Upper wing-coverts are uniform dark brown or buff-fringed in adults, and white-tipped or white-spotted in immatures (never spotted in genus *Aquila* as redefined here; see below). The bill is proportionately smaller and shorter than typical in revised *Aquila*, the nostril is round (vs. oval in *Aquila* except *africana*, *fasciata* and *spilogaster*), and the tibia and tarsus are slender, not robust, and close-feathered ('trouserless') vs. longer feathered, 'baggy-trouserred' in *Aquila*, again except for *africana*, *fasciata* and *spilogaster* (none of which is wholly brown-bodied at any life-history stage). Further, the secondaries of adults are longer than those of juveniles, whereas the reverse is true in *Aquila* (see pl. 420 and 422 in Forsman 1999 for this in Greater Spotted).

Taxonomic content.—The genus *Aquiloides* comprises three currently recognised species hitherto included in *Aquila*: *clanga* (Pallas, 1811), *pomarina* (C. L. Brehm, 1831) and *hastata* (Lesson, 1832).

Etymology.—The name *Aquiloides* is derived from the Latin *aquila*, meaning eagle, and the Greek εἶδος, meaning form or likeness, in deference to these birds' *Aquila*-like appearance and behaviour. Following on from *Aquila* and in accordance with Art. 30.1.4.4 of the Code (ICZN 1999), the gender of the new name is designated to be feminine.

A further, incidental advantage of this smaller genus approach is that it facilitates retention of the name *Hieraetus* for eagles related to *pennatus* (Booted Eagle, type species of the genus), i.e., Little Eagle *H. morphnoides* (including the recently proposed split, Pygmy Eagle *H. weiskei*), Wahlberg's Eagle *H. wahlbergi* and Ayres's (Hawk-) Eagle *H. ayresii*.

Lerner & Mindell (2005) recovered molecular evidence (in line with existing morphological clues) that Rufous-bellied Eagle *H. kienerii* is strongly divergent from these other *Hieraetus*. Subsequently, Haring *et al.* (2007) recommended that the monotypic genus *Lophotriorchis* Sharpe, 1874, be resurrected for it.

This then appears to leave genus *Aquila* of Brisson, 1760 (type species *Falco chrysaetos* Linnaeus, 1758) with the following components: Golden Eagle *A. chrysaetos*, Tawny Eagle *A. rapax* (Temminck, 1828), Steppe Eagle *A. nipalensis* Hodgson, 1833, Spanish Imperial Eagle *A. adalberti* C. L. Brehm, 1861, Eastern Imperial Eagle *A. heliaca* Savigny, 1809, Gurney's Eagle *A. gurneyi* G. R. Gray, 1861, Wedge-tailed Eagle *A. audax* (Latham, 1802) and Verreaux's Eagle *A. verreauxii* Lesson, 1831, plus on currently agreed molecular evidence (Haring *et al.* 2007) *A.* (formerly *Hieraetus*) *fasciata* and *spilogaster*, and *A.* (formerly successively *Cassinaetus*, *Hieraetus* and *Spizaetus*) *africana*.

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